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|-----------------|--------------|
| EXAMINER | |
| CANTELMO, GREGG | |
| ART UNIT | PAPER NUMBER |
| 1745 | |

DATE MAILED: 09/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/867,383

Applicant(s)

KOUYAMA ET AL.

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 1-13, 21 and 23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-20, 22 and 24-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 May 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Response to Amendment

1. In response to the amendment received September 9, 2003:
 - a. Claims 1-30 are pending with claims 1-13, 21 and 23 drawn to a non-elected invention. Action on the merits of claims 14-20, 22 and 24-30 is as follows;
 - b. The drawing objections stand;
 - c. The claim objections have been withdrawn in light of Applicant's point of clarification;
 - d. The 112 first paragraph rejection is overcome in light of Applicant's amendment to claim 28;
 - e. The prior art rejections have been withdrawn in light of the amendment. However since the scope the claims has been further limited to include an L-shaped gap as recited in claim 14, the pending application is open to final rejection necessitated by amendment.

Election/Restrictions

2. Applicant's election with traverse of group I, claims 1-13, 21 and 23 in Paper No. 11 is acknowledged. The traversal is on the ground(s) that the Examiner has not shown that the two inventions are independent or distinct. This is not found persuasive.

In comparing the scope of claim 1 with respect to claim 14 it is held that the invention of claim 14 is significantly different in scope relative to the limitations of claim 1 and for such reasons is held to be patentably distinct from claim 1.

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention. See MPEP § 809.02.

Applicant has not met the requirement of submitting evidence or identifying such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. Claims 1 and 14 are held to be species which are not obvious variants of one another and therefore the species election stands. See MPEP § 806.

Furthermore, where inventions are related as disclosed but are distinct as claimed, restriction may be proper. Note that the limitations of claim 1, which includes an annular dielectric member and the apparatus does not require the gap configuration as set forth in claim 14 and therefore claim 1 is distinctly claimed from claim 14. Likewise claim 14, which requires the gap relationship, does not recite the dielectric annular member and therefore claim 14 is distinctly claimed from claim 1. In addition claim 14 defines the cathode and the axial extension limitation a metal plate adjacent but only in a location outside of the given axial extent of the cathode wherein an outer

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circumferential edge of the metal plate is electrically grounded to the processing chamber and the mental plate having particular gap limitations and an L-shaped bend between first and second portions.

The requirement is still deemed proper and is therefore made FINAL.

Drawings

3. Figures 10 and 11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). See the page 1 and the Brief Description of the Drawings wherein these figures are disclosed as representations of conventional devices.

Response to Arguments

4. Applicant's arguments filed September 2, 2003 have been fully considered but they are not persuasive.

As set forth in the previous office action:

Applicant argues that the Applicant's have not admitted that the subject matter of Figs. 10 and 11 are not prior art. The Examiner is not readily persuaded. As set forth above and in the previous office actions, page 1 refers to Fig. 10 as a "conventional high frequency sputtering device" and Fig. 11 being a magnified view of the gap in the apparatus of Fig. 10. As well the brief description of the drawings identifies Figs. 10 and 11 as conventional.

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Applicant's representative states that "applicants are not aware of a specific prior art teaching of this subject matter." If this is an accurate statement, how then could applicant identify these figures as conventional, such language leading one of ordinary skill in the art to interpret that such devices were known to applicant and known to one of ordinary skill in the art (thus conventional).

Further in response to arguments presented September 2, 2003:

Applicant's response on page 12 of this amendment has been considered but is not particularly persuasive. First the positions set forth therein are held to be speculative since there is no clear evidence or statements which rule out that the term "conventional" as set forth in the original disclosure is not prior art.

The arguments therein are not appreciative of the full scope of the term prior art. For example, the position as to the structure potentially being sold in a country outside of the U.S would not lend the structure to qualify as prior art may be an accurate statement, but is speculative. Even if such a statement were applicable, it doesn't address such teachings overcoming a 102(a) rejection since it makes no clear statement or declaration that there is no published documentation regarding these figures.

The term conventional is held to be a teaching that such arrangement was not only known to Applicant but further to one of ordinary skill in the art at the time the claimed invention was conceived, and in the least conventional at the time the priority document was written. In addition the term conventional in relation to the priority

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document would have to be drawn to an apparatus that was available for an extended period of time, enough time to have been readily accessible to one of ordinary skill in the art, thereby rendering it "conventional".

In summation, while the Examiner has considered Applicant's position, the arguments and statements made by Applicant are speculative and are void of concrete evidence or declarations that the term "conventional" as used in the original disclosure of the instant application does not constitute prior art and therefore is not prior art. Therefore, The Examiner maintains the objection to the drawings.

Claim Objections

5. Claim 30 is objected to because of the following informalities: it fails to end the claim with a period. Appropriate correction is required.

Claim Rejections - 35 USC § 102/103

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 14, 16, 18, 29 and 30 are rejected under 35 U.S.C. 103(a) as obvious over Katsura in view of either the admitted prior art of the instant application or U.S. patent No. 4,401,546 (Nakamura).

Katsura discloses a high frequency (HF) sputtering device comprising: a processing chamber SR, a HF power supply (RF power attached to backing plate 13), a backing plate 13 (cathode) inside the processing chamber inherently electrically insulated from the processing chamber (thus ensuring that the attraction bias to sputter the cathode is only applied to the target and not the remainder of the processing chamber) the cathode 13 connected to the HF power and extending only along a given axial extent of the processing chamber, a target 14 mounted on the first side of cathode 13, a metal plate mounted in the processing chamber adjacent to the cathode 13 but only in a location outside of the axial extent of the cathode 13, the metal plate 16 having a central opening wherein an outer circumferential edge of the metal plate 16 is electrically grounded (in electrical ground connection with chamber wall 11, the metal plate is arranged so as to form a gap having a first portion between the metal plate 16 and cathode 13 and a second portion between the metal plate 16 and target and wherein the gap includes a bend between the first portion and second portion so that the gap is substantially L-shaped (Fig. 1 as applied to claim 14).

The relative arrangement of the gap with respect to the target and cathode is a suggestion of a small spacing between them.

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The metal plate 16 is located at the side of the target 14 (Fig. 1 as applied to claim 16).

The first portion is defined by horizontal surfaces between the metal plate 16 and cathode 13 and the second portion is defined between vertical surfaces of the metal plate and target (Fig. 1 as applied to claim 29).

The gap closest to the target is in the second portion (Fig. 1 as applied to claim 30).

The differences between claims 14, 18 and 24 and Katsura are that Katsura does not teach or the gap being sufficiently narrow and long enough to prevent plasma from passing through the gap (claim 14) or of the width of the gap being less than 3 mm (claims 18 and 24).

The admitted prior art teaches that gap spacing of 2 mm is known for the purposes of preventing plasma from entering the gap (page 1, paragraph [0003]).

Nakamura teaches the same concept (col. 3, ll. 36-47). This prevents sputtering of the cathode.

The motivation for providing gap spacing of 3mm or less is that it prevents plasma from entering the gap between the shield and target/cathode.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Katsura by using a gap width of less than 3mm since it would have prevented plasma from entering the gap between the shield and target/cathode.

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9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katsura in view of JP 57 194 254 (JP '254).

The teachings of claim 14, with respect to Katsura, have been discussed above and are incorporated herein.

The difference between the instant claim and Katsura is that Katsura does not appear to teach of the shield and target being the same material (claim 17).

JP '254 discloses that is advantageous to use a shield member which is of the same material as the sputtering target (abstract).

The motivation for providing a shield and target of the same material is to prevent abnormal discharging (abstract). Furthermore one of ordinary skill in the art would have also recognized the use of a shield member of the same material as the target also reduces the risk of contamination of the film formed on the substrate if a portion of the shield material is sputtered.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Katsura by providing a shield and target of the same material since it would have prevented abnormal discharging and reduced the risk of contaminating the film formed on the substrate.

10. Claim 19, 20, 22, 25 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katsura in view of JP 57 194 254 (JP '254) and either the admitted prior art relied upon in the instant application or Nakamura.

The teachings of claim 14, with respect to Katsura, have been discussed above and are incorporated herein.

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The differences between the instant claims and JP '377 are of the depth of the gap being 3 mm or greater (claims 19, 20, 22, 25 and 26-28).

JP '837 discloses a HF sputtering system wherein the earth shield around the target is configured such that it prevents plasma from entering the space between the side of the target and the shield ring (abstract).

In such a configuration, the gap between the target and shield is 0.5-5 mm and the depth of the gap is 1-10 mm (abstract). Note that a significant portion of the gap depth range of JP '837 (3-10 mm) is the same gap depth as recited in the instant claim with 10 mm being a specific data point.

Given the obvious modification of Katsura in view of either the admitted prior art of the instant application or Nakamura one of ordinary skill in the art would have found it obvious to prevent plasma from entering the gap between the shield member and target/cathode. By restricting the plasma from the region between the target and shield, no sputtering of the cathode will occur and only the target material itself will be sputtered. The result is a highly pure target deposited film on the substrate void of sputtered contaminants.

In order to prevent plasma from entering this region, one of ordinary skill in the art would have found it obvious to optimize the depth of the gap defined by the metal plate 26 to be any depth which prevents plasma from entering the gap having a width of 3 mm or less (as taught by Nakamura and the admitted prior art relied upon in the instant application). Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such

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ranges is critical. In re Boesche, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

The motivation for providing a gap depth of 3 mm or greater is that it would have provided an arrangement which would have prevented plasma from entering the space between the side of the target and the shield (as applied to claims 19, 20, 22 and 25-28).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Katsura by providing a gap depth of 3 mm or greater since it would have provided an arrangement which would have prevented plasma from entering the space between the side of the target and the shield.

Response to Arguments

11. Applicant's arguments with respect to claims 14-20, 22 and 24-30 have been considered but are moot in view of the new ground(s) of rejection.

The previous prior art rejections were withdrawn in light of the amendment to claim 14. However by further defining the claim, the instant application is subject to a new grounds of rejection necessitated by amendment.

The new art of Katsura is held to be significantly similar to the claimed invention as described above and obvious in view of the secondary references applied above.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (703) 308-2383. FAX communications should be sent to the appropriate FAX number: (703) 872-9311 for After Final Responses only; (703) 872-9310 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day. Any inquiry of a

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general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Gregg Cantelmo
Patent Examiner
Art Unit 1745

gc



September 25, 2003